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ABSTRACT

This paper describes a World Wide Web site on learning theories, developed as a class assignment for a course on learning and instructional theories at Concordia University (Quebec). Groups of two to four students developed pages on selected theories of learning that were then linked to a main page developed by the instructor and a doctoral student. Overall, the Web site examines issues and applications of learning theories, including behaviorism, cognitive information processing, meaningful reception learning, schema theory and mental models, Piaget's genetic epistemology, interactional theories of cognitive development, motivation theory, Gagne's theory of instruction, and constructivism. Each page or series of pages summarizes the main points of a particular theory, provides practice-with-feedback questions for the user, gives examples of how the theory is used in actual practice, and includes related articles so that the user can further pursue the topic. The aim of the site is to provide an understanding of theoretical and practical issues related to the numerous theories of learning so students can engage in high-level discussions in the course. An appendix illustrates the course home page and the pages on interactional theories of cognitive development and Gagne's theory of instruction. (DLS)

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Teaching Learning Theories Via the Web

1999 AECT National Convention
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Over the last several years, computer technology has played an increasingly important role in the realm of education and training. Computer assisted instruction (CAI) has existed almost as long as computers themselves, but the increased power and availability of microcomputers has made them a much more viable tool for educators.

The increased influence and capability of the Internet and the World Wide Web have caused hypertext to become a widespread method of linking knowledge bases via several media. The dynamic character of this form of instruction, as well as its nonlinear mode of information dispersal, inherently integrates learner-control aspects into its construction. Advocates of learner control state that individual learners know their own instructional needs and are best able to adjust the amount of instruction to meet these needs (Mager, 1964; Merrill, 1975, 1980; Kinzie, Sullivan, & Berdel, 1988). Free-access navigation environments in multimedia also seem to lend themselves well to instruction in graduate-level settings. It has been reported that college students are able to adequately judge the fashion in which they need to review computer screens in order to be able to increase posttest scores (Savenye, Leader, Schnackenberg, Jones, Dwyer, & Jiang, 1996). Also, Hannafin (1984) states that older, more able students perform best under such learning conditions.

In light of the favorable findings on the use of learner-controlled media environments and adult learners, a website for a graduate-level course in learning theories is being developed to facilitate student learning of complex topics. As a course assignment, groups of two to four students are responsible for developing a webpage/website on a selected theory of learning. Each page/site contains some similar components, but in general reflects the individuality and creativity of each group. When the students have finished constructing their page/site, it is then transferred to the professor's university webspace to make maintenance of the overall site easier. The main page for the site was co-developed by the course instructor and a doctoral student pursuing a degree in Educational Technology. See Appendix A for examples of the various pages.

Overall, the website examines issues and applications of the various learning theories in education. Each page (or series of related pages), summarizes the main points of a particular theory, provides practice-with-feedback questions for the user, gives examples of how the theory is used in actual practice, and includes related articles so that the user can further pursue the topic if desired. The aim of the site is to provide an understanding of theoretical and practical issues related to the numerous theories of learning so students can engage in high-level discussions surrounding these issues in the actual course. Topics that are included in the website consist of the following:

- Behaviorism
- Cognitive Information Processing
- Meaningful Reception Learning
- Schema Theory and Mental Models
- Piaget'sGeneticEpistemology
- Interactional Theories of Cognitive Development *
- Motivation Theory
- Gagne's Theory of Instruction *
- Constructivism *

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(* Asterisk denotes topics for which students have presently developed a page or set of pages.)

Once the site is fully developed and field tested, it is hoped that it can be used to deliver the course in a web-based, distance learning format. While means of communication between students and the course professor, and among students themselves, is not built into the website, other online forms of communication are available and widely utilized in the university department where the course

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is taught. Both email and an intranet communication system called FirstClass is used regularly by both students and faculty alike. It is assumed that these methods of communication, along with the telephone, would be the means of communication should the site be used to deliver the course.

Future research ideas involving the site are currently under consideration. The effects of various learner characteristics, such as self-efficacy, need for affiliation, and computer anxiety, on the use and effectiveness of web-delivered instruction are certainly worth investigating. Also, educator's resistance to the use of these technologies at the collegiate level are also worthy of further exploration. Once the site described in this paper is fully developed it will serve as a useful vehicle in pursuit of the answers to some of these types of questions. It is the authors' hope that participants will walk away from this presentation interested not only in the site itself, but also with the idea that the Internet can in fact become an important method for dissemination and acquisition of information in graduate-level instruction.

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APPENDIX A

CONCORDIA UNIVERSITY

Graduate Program in Educational Technology

ETEC 513/613 Learning and Instructional Theories

Professor	**Heidi L. Schnackenberg, Ph.D.**
Office	LB 564-9
Office hours	4:00 p.m. - 6:00 p.m. Tuesday Other times by appointment
Office Phone	(514) 848-2037
E-mail	heidis@alcor.concordia.ca

Course Description:

The phenomena associated with learning seems to lie at the heart of education. This course examines the processes of specifying and producing environmental conditions for observing or promoting changes in the student. Its tow-fold focus will be the study of the learning process (including the learner), and instructional "theories" which provide guidelines for designing learning systems (for education or training).

This course is intended to prepare the student to engage in critical appraisal of research work in the field. Accordingly, the student will be expected to develop both a broad and deep understanding of the basic theories of learning, as well as competence in selected aspects of certain areas.

The learning opportunites provided in this course may include any combination of the following activities:

- an individual or group presentation concerning theories of learning and their principle proponents and the social and education implications;
- participation in a regular problem and theory-oriented seminar;
- critiques of recent journal articles on the subject;
- completion of a grop research project studying some aspect of learning/training in the "real world;"
- research papers/questions on various aspects of the theories discussed in the course;
- examinations regarding the theories presented in class; and
- media-based projects detailing and incorporating particular learning into the design.

Course Textbook:

Driscoll, M.P. (1994). Psychology of Learning for Instruction. Needham Heights: Allyn & Bacon.

Other Recommended Sources:

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Explorations in Learning & Instruction: The Theory into Practice Database at http://www.gwu.edu/~tip/index.html

Learner-Centered Psychological Principles: A Framework for School Redesign and Reform at http://www.apa.org/ed/lcp.html

About Learning/Theories at http://www.funderstanding.com/theories.html

IT Links at http://saga.umkc.edu/it/it-links.html

Course Attendance:

Attendance points are not given in this class. However, if you miss class you are responsible for the material covered that day.

Student Evaluation :

This course is worth 400 total possible points. No extra credit will be awarded. Letter grades will be assigned as follows:

- A+ = exceptional work
- A = exceptional work
- A- = exceptional work
- B+ = expected work
- B = expected work
- B- = expected work
- C = adequate work
- F = failure

Course Assignments/Exams:

Unit Presentation Groups. Each of you will be assigned a group to work with and a unit to teach. This activity is worth 100 points and is to be done in class on the day the unit is scheduled to be taught. You and your group will teach the material in that unit in a style representing the learning theory that you are teaching. You are free to use worksheets, group or individual activities, computer simulations or computer-based instruction, lectures, group discussion of pre-assigned journal articles, or whatever other materials or teaching-style you feel are/is appropriate for the unit you are teaching. Please make your presentation as creative and as interesting as possible! The presentations should be an hour and a half to two hours long.

In addition, prior to their presentation date, each group is required to meet with the instructor to receive feedback on and approval of the information they will present and the type(s) of activities they will incorporate. This will ensure that the class is receiving quality instruction/information on each theory. Should a critical element of any topic be omitted by any group, the instructor will cover it the following week in class.

You also are expected to give feedback to your classmates about their presentations using the attached scoring sheet (you will need to make 10 copies - one copy for each presentation but your own). These sheets will be completed at the end of each class session and given to the presenting group prior to the end of the class. However, your feedback will not count toward a grade. Presentation grades will be determined by the instructor's overall score.

Webpage Groups. Each of you will be assigned to work with a group and a unit to program into a

webpage. These groups will be different from the Unit Presentation Groups. This activity is worth 100 points. You and your group will create an interactive webpage about the particular learning theory you are assigned. The page will need to include detailed information about the theory, references and other sources for the reader to explore, and practice questions (with feedback) about the theory (so the reader can find out how much they learned about the theory from your page). Each groupÕs page will be linked and turned into a website by the course instructor. Assistance in programming the page is available from both the course instructor aswell as other classmates. Please do not worry about the actual computer programming. The content of the page is you and your groups primary concern and responsibility. The programming is secondary. Webpage grades will be determined by the instructorÕs overall score.

Midterm Exam. Upon completion of Unit 5, Schema Theory and Mental Models, you will be given a midterm exam. This exam is worth 100 points and will incorporate ideas and concepts from chapters 1-5 in your course textbook, Psychology of Learning for Instruction. The test may utilize any combination of multiple-choice, constructed response, and essay questions.

Final Exam. Upon completion of Unit 11, Constructivism, you will be given a final exam. This exam is worth 100 points and will incorporate ideas and concepts from chapters 6 & 7, and 9-11 in your course textbook, Psychology of Learning for Instruction. The test may utilize any combination of multiple-choice, constructed response, and essay questions.

Course Schedule:

The following schedule is for the Winter 1999 section of this course.

January 5, 1999	Introductions/group assignments/Unit 1. Read Units 1 & 2 in Psychology of Learning for Instruction for homework.
January 12, 1999	Unit 2 Group instructs. Read Unit 3 in Psychology of Learning for Instruction for homework.
January 19, 1999	Unit 3 Group instructs. Read Unit 4 in Psychology of Learning for Instruction for homework.
January 26, 1999	Unit 4 Group instructs. Read Unit 5 in Psychology of Learning for Instruction for homework.
February 2, 1999	Unit 5 Group instructs.
February 9, 1999	Course research/study day.
February 16, 1999	**Midterm Exam**.

February 23, 1999	**MIDTERM BREAK!!!!!** Read Unit 6 in Psychology of Learning for Instruction for homework.
March 2, 1999	Unit 6 Group instructs. Read Unit 7 in Psychology of Learning for Instruction for homework.
March 9, 1999	Unit 7 Group instructs. Read Unit 9 in Psychology of Learning for Instruction for homework.
March 16, 1999	Unit 9 Group instructs. Read Unit 10 in Psychology of Learning for Instruction for homework.
March 23, 1999	Unit 10 Group instructs. Read Unit 11 in Psychology of Learning for Instruction for homework.
March 30, 1999	Unit 11 Group instructs.
April 6, 1999	**Final Exam**. Group webpages are due.

THEORIES OF LEARNING

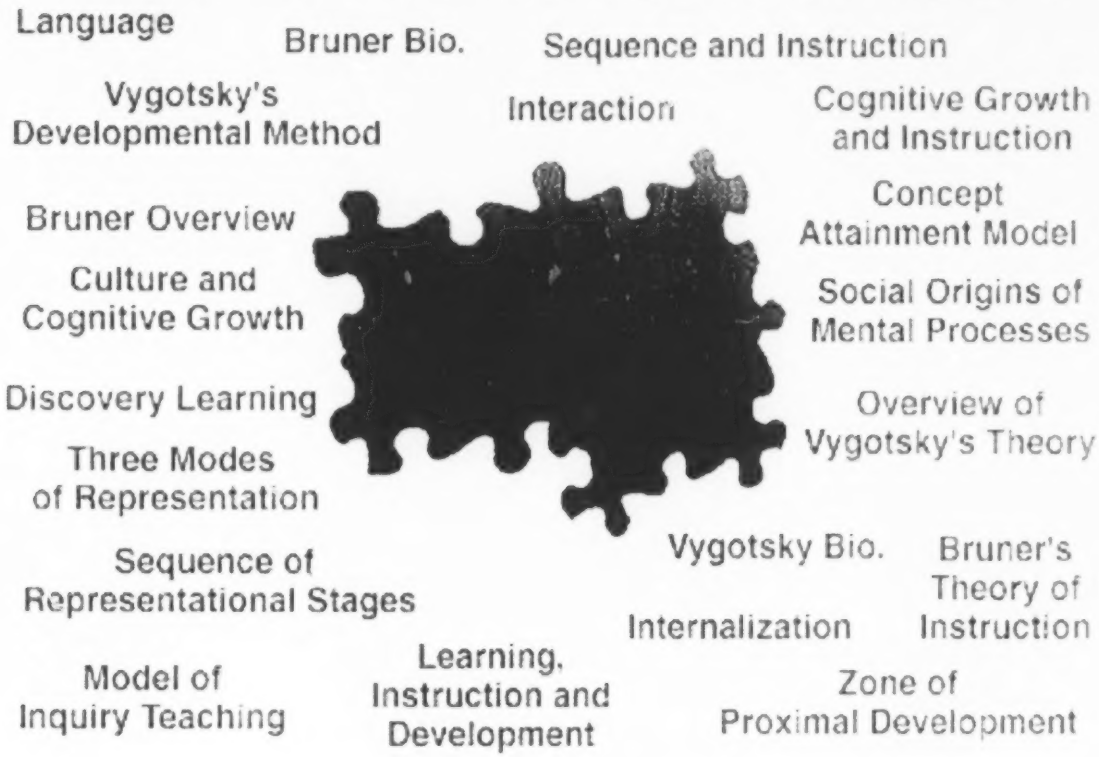
INTRODUCTION	BEHAVIORISM	COGNITIVE INFORMATION PROCESSING
MEANINGFUL RECEPTION LEARNING	SCHEMA THEORY AND MENTAL MODELS	PIAGET'S GENETIC EPISTEMOLOGY
INTERACTIONAL THEORIES OF COGNITIVE DEVELOPMENT *Page created by Sonia Di Maulo, Fanny Korman, and Caroline Taran.	BIOLOGICAL BASES OF LEARNING AND BEHAVIOR	LEARNING AND MOTIVATION
GAGNE'S THEORY OF INSTRUCTION *Page created by Brenda Lonz, Laura Paterson, and Reubin Tozman.	CONSTRUCTIVISM *Page created by Makoto Nakamura, Dobrica Savic, and Marie-Claude Trembley.	CONCLUSION

This page was created by Dobrica Savic, a Ph.D. student in the Educational Technology Program at Concordia University.

It is maintained by Dr. Heidi L. Schnackenberg. Please send questions or comments to:

heidis@alcor.concordia.ca

Interactional Theories of Cognitive Development



GAGNE'S THEORY OF INSTRUCTION

Contents

Part 1 Introduction: What is instructional theory?
Part 2 A taxonomy of Learning Outcomes
Part 3 Instructional Objectives & Conditions for Learning
Part 4 The Learning Process
Part 5 Nine Events of Instruction
Part 6 References

Part 1: What is Instructional Theory?

In the most general sense, instruction is intended to promote learning. Through the means of instruction the learning environment is arranged to stimulate, support and maintain internal processing that constitute learning. An instructional theory is not a learning theory rather it adopts and uses what appears to be the principles of learning theories based upon existing research

In addressing the phenomena of learning, Gagné ascribes to prototypes of learning which he believes helps us to understand human learned capabilities. These prototypes are: conditioning, trail and error learning, insight and the law of effect; all of which are founded within behaviorism. This behaviorist framework is fundamental to the various learning outcomes of Gagné's Instructional Theory.

The purpose of instructional theory is to be prescriptive. It attempts to do so by providing principles by which teachers, instructors, coaches and instructional designers can assure learning. Understanding how instructional principles and events function in different learning situations and for different types of learning provides direction for making appropriate instructional prescriptions.

Part 1,Part 2, Part 3, Part 4, Part 5, Part 6

Part Two: Gagne's Taxonomy of Learning Outcomes

There are many different types of learning: from knowing facts to knowing how to drive. Learning theorists have proposed many classifications of types of learning (See Bloom et al., 1956). Gagne was the first learning theorist to propose a taxonomy of learning outcomes which encompassed the cognitive, affective and psychomotor domains. The chart below describes Gagne's Taxonomy of Learning Outcomes. Hint: We'll come back to this information in Part Three.

Types of Learning Outcomes	Example
Verbal information: Stating previously learned material such as facts, concepts, principles&procedures	List, in writing, the five most influential behavioral psychologists
Intellectual Skills: Discriminations: Distinguishing objects, features, or symbols Concrete Concepts: Identifying classes of concrete objects, features or events Defined concepts: Classifying Defined concepts: Classifying new examples of events or ideas by definitions Rules: Applying a single relationship to solve class of problems Higher Order Rules: Applying a new combination of rules to solve a complex problem	Discriminate by matching the French sounds of "u" and "ou" Identify orally works of art which are examples of art deco Classify by using a definition, the concept of "family" Demonstrate by solving verbally stated problems, the addition of positive and negative numbers Generate by synthesizing applicable rules, a paragraph describing a person's actions in a situation of fear
Cognitive Strategies: Employing personal ways to guide learning, thinking, acting and feeling	Originate a solution to the reduction of air pollution, by applying model of gaseous diffusion
Attitudes: Choosing personal actions based on internal states of understanding and feeling	Choose to take out books from the library
Motor Skills: Executing performances involves the use of muscles	Execute backing a car into a driveway

Above examples from:

Brophy, J. & Good, T. (1996). Educational Psychology. New York: Longman Inc. (p.144).

(Hint: This information will be important to complete Part Three)

Part 1, Part 2, Part 3, Part 4, Part 5, Part 6

Part Three: Instructional Objectives & Conditions for Learning

To provide effective instruction, teachers, instructors and coaches should decide precisely what they expect of their students. These learning goals are referred to as **instructional objectives.**

Gagne stated that achieving learning objectives requires that certain **learning conditions** exist both within the learner and external to the learner. Learning conditions help teachers and instructional designers deliver instruction that is appropriate for each type of learning outcome.

1. The type of learning outcome as described in the chart in section two.
2. The kinds of conditions presented that may help the student to learn.

For every Learning objective and scenario you are given the box "Let's See". When you are ready to see the answer press this box and a screen will appear. Depending on your browser, the title of the box may say different things or make different sounds. Ignore these and look at the content, it may be extremely helpful.

Learning Objective 1:
The learner chooses to eat foods that are low in fat and low in calories in order to control weight.

Scenario 1:
The instructor, who is presently at a proper weight, shows a picture of herself when she was overweight and discusses the types of foods she ate then (high fat and high calorie food). Then she shows the types of food she eats now to maintain her present weight (low fat and calories). She tells them that if she can do it so can they. At weekly meetings, participants discuss their food choices and the instructor gives praise for appropriate choices.

Learning Objective 2:
Shown both pictures and reality, students will identify, by pointing, the root, leaf and stem of 10 varieties of plants.

Scenario 2:

Teacher: The teacher shows the class pictures of different kinds of plants, with the root, stem and leaf highlighted with different colours. He asks students to identify the root, leaf and stem. Then, students visit a greenhouse and identify the root, stem and leaf of real plants.

Learning Objective 3:
After studying a paragraph, students will visually indicate the relationships of concepts by presenting them in a concept map.

Scenario 3:
The teacher presents students with a written passage. After allowing 10 minutes for students to read it, he thinks aloud while drawing a concept map of the main points of the passage. He then gives students another passage, and asks then to create their own concept

map. After completing the map, students receive guidance from the teacher.

Learning Objective 4:
Given a bat, the learner will stand at home at home plate, swing at a baseball that has been thrown and make contact between the bat and the baseball.

Scenario 4:
A coach wants players to develop good batting technique. He describes each aspect of the technique as he performs the actions. Players try out each part of the technique and then bat at a ball while the coach gives encouragement and tips. Before taking their turn at bat, the coach asks each player to imagine doing all the steps of good batting technique and hitting the ball.

Learning Objective 5:
List, verbally, 5 significant battles of World War Two.

Scenario 5:
The teacher posts a timeline of the battles of World War Two. He underlines the most significant battles and describes why these battles were significant. He then forms a mnemonic for 5 significant battles of World War Two and encourages students to form their own.

Part 1, Part 2, Part 3, Part 4, Part 5, Part 6

Part Four: The Learning Process

The external conditions of learning influence and provide support to the internal processes of learning. The internal learning process according to Gagné begins with the intake of stimulation from receptors and ends with feedback. During learning, internal processes occur in sequences or two or more processes may occur in parallel.